

# THE MOTOR AGE

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## CHICAGO MOTOR-PACED RACES

A WEEK OF RACING CULMINATES IN EXCITEMENT, CONFUSION, NOISE, DISSATISFACTION AND BROKEN RECORDS—TWO MEN WIN ONE RACE

The week of racing at the great Chicago Coliseum came to an end on Sunday evening amid scenes of the wildest excitement. Comparatively fast time was made in all the races, but it remained for the two stars, Jimmy Michael and Johnny Nelson, to establish new records for indoor racing for every mile from the second to the fifteenth, inclusive, despite the fact that each of the stars met with an accident during the course of the final fifteen-mile paced event.

The greatest rivalry exists between Michael and Nelson. When they came to-

gether on Sunday evening, the largest audience of the week greeted them. There was a long delay in getting them on the track, owing to careful preparation of the motor teams of both contestants and the preliminary agreements between the men. It was agreed between the two, with the sanction of the referee, that in case of any accident to either rider or his motor, within the first mile, that the men should be called off the track and the race started over.

They started off in none too good shape, both failing to catch their motors

promptly. Michael was the first to connect with his pacing machine, and, before Nelson had caught his and settled down to steady riding, the Welch midget had a lead of nearly a quarter of the distance around the track, which is ten laps to the mile. Nelson quickly cut down this distance, however, to the smallest of margins and repeatedly tried to pass Michael, who staved off his attempts. The mile was completed in 1:48 2-5, with Michael in the lead by a scant three yards. Just over the tape Michael's motor began to slow down perceptibly and it was evident that there was something wrong with it. Nelson passed his opponent and Michael followed him, a new motor being put promptly in commission for the Welchman. Michael, however, acting on the instructions of his handlers, after a brief attempt to catch the pace, sat up and left the track, Nelson continuing for nearly five miles at a terrific pace.

#### **Pandemonium Reigns**

In the meantime the spectators raised pandemonium, hissing, cheering, cat-calling and stamping to express their approval or disapproval. Meanwhile, the referee was beset by a host of managers, trainers and track habitues, as well as scores of people who had bets on the race. It was maintained by some that the accident to Michael's motor occurred before the mile had been completed and by some that it had occurred after the tape had been crossed. The referee stated that, in his opinion, the accident had happened after the tape was crossed, as Michael had crossed it close behind the motor tandem—and in remarkably fast time at that—that he had seen no evidence of accident until the mile had been completed, and that, therefore, there was no reason for stopping the race. The accident happened within fifteen yards of the tape, one side or the other, and the exact point was a difficult thing to decide, with the men going more than thirty-five miles an hour. The referee, however, refused to change his decision an iota.

#### **Kennedy's Dual Role**

Finally, J. C. Kennedy, in the double role of manager for Michael and promoter of the race meet, asked, inasmuch

as the race was Nelson's, that he be called from the track and that the two men ride an exhibition race, to satisfy the spectators. The referee assented to this, and called Nelson from the track, first awarding him the race. Then all the trouble broke out anew. The referee was again besieged with requests, threats and denunciations, and still he refused to budge an inch from the position which he had taken. The spectators, in the meantime, were in ignorance of the nature of the referee's decision and howled their approval or disapproval.

#### **The Men Start Again**

Finally, the two men were started again; their rivalry was not lessened by the preceding events. Again Michael got the lead and maintained it for more than six miles, although Nelson made repeated attempts to pass and frequently got on even terms with his rival on the straights, only to lose his advantage by the longer distance he had to travel on the turns. All this time big slices were being cut from the indoor records after the first mile.

#### **Another Accident**

Early in the seventh mile, a tire on Michael's motor tandem exploded and the team, Crooks and Sherer, came to the ground. Michael managed to avoid the mix-up, as did Nelson and his pacemakers, although it looked like an impossibility. Nelson lost his pace and Michael appropriated it, only to lose it to Nelson a lap later on. Before the midget could get behind his own fresh tandem, he had lost a lap and two-thirds. At the time of the accident, the riders were 33 1-5 seconds inside the indoor record.

#### **Nelson's Nasty Fall**

When Nelson obtained the lead, he continued Michael's work of clipping the records, being 35 seconds inside at the completion of the ninth mile. At the tenth mile, a tire on his motor tandem, manned by Hoyt and Ruel, exploded and the team went down, carrying Nelson with them. It seemed as if none of the trio could have missed serious injuries, but all three escaped with a few cuts and bruises. Nelson was soon on the track again on a reserve machine and his

reserve motor was immediately sent out. Michael, in the meantime, had recovered all his lost distance, being far enough back of the fallen team to be able to swerve out without losing his pace more than momentarily, and had gained a lead of a lap and a half. When Nelson got to going, he was unable to make up any of the distance, but, rather, fell still more behind, a thing not to be wondered at, after his preliminary five-mile ride and his severe shaking up in the fall. At the finish, Michael was just short of two laps in the lead, in the fast time of 26:20 3-5, cutting the indoor record for the fifteen miles by 43 3-5 seconds. He was greeted by a storm of applause.

#### Details of the Race

The following are the times by miles:

Mi.	Leader.	Time.	Previous Record.
1..	Michael by 30 yds.	1:49	1:47 1-5
2..	Michael by 20 yds.	3:23	3:44
3..	Michael by 5 yds.	5:09	5:28 1-5
4..	Michael by 5 yds.	6:50	7:14 3-5
5..	Michael by 3 yds.	8:31 4-5	9:00 1-5
6..	Michael by 5 yds.	10:13 3-5	10:46 4-5
7..	Nelson by 295 yds.	12:05 3-5	12:33
8..	Nelson by 235 yds.	13:43 3-5	14:20
9..	Nelson by 220 yds.	15:32 3-5	16:07 3-5
10..	Michael by 265 yds.	17:26	17:54 4-5
11..	Michael by 290 yds.	19:15 4-5	19:44 4-5
12..	Michael by 295 yds.	21:03 1-5	21:34 1-5
13..	Michael by 300 yds.	22:50	23:24 1-5
14..	Michael by 310 yds.	24:37	25:14 2-5
15..	Michael by 340 yds.	26:20 3-5	27:04 1-5

#### AUTOMOBILE CLUB ELECTION

New York, Oct. 20.—An opposition ticket has been put in the field to be voted upon at the annual meeting of the Automobile Club of America on Monday evening. There is no opposition to the candidacy of Albert R. Shattuck for the presidency. The opposition, however, names Albert C. Bostwick against Gen. George Moon Smith for first vice-president; Jefferson Seligman against Winslow E. Buzby for treasurer; Malcolm W. Ford against Whitney Lyon for secretary; and Sidney Dillon Ripley against Charles P. Doelger for governor. J. M. Ceballos supplants Albert C. Bostwick, who is made opposition candidate for first vice-president.

New York, Oct. 23.—The second annual election of the Automobile Club of Amer-

ica, which took place last evening, resulted in the election of the complete opposition ticket. The treasurer's report showed a balance in the treasury of \$21,000. The club now has a membership of 262.

#### Two Clubs for Brooklyn

Within the past week two automobile clubs have been organized in Brooklyn—the Automobile Club of Brooklyn last Saturday and the Automobile Club of Long Island last Thursday.

Both the clubs have sent incorporation papers to Albany. The Brooklyn club has for incorporators E. J. Bergen, V. F. Parker, E. W. Mersereau, B. F. Tyler, Dr. J. O. Polak, C. B. Dix, R. H. Jones, J. De Witt Gardam, H. Kryn, F. D. Maltby, C. H. Tangeman, Dr. C. B. Parker, P. C. Lengs, De Witt Parker. The incorporators of the Automobile Club of Long Island are L. R. Adams, James C. Church, C. W. Spurr, Robert Darling, Frank G. Webb and Arthur R. Pardington.

#### AUTO ASPHYXIATION

A strange story comes from Yonkers, N. Y., concerning Frank R. Ford, who, it appears, is blind, and yet indulged in the purchase of an automobile some time ago. Despite his affliction, he managed to master the intricacies of the mechanism of his gasoline machine.

Recently he discovered that gasoline vapor was escaping from one of the cylinders, and he determined to repair the leak himself. He went to the barn where the automobile is kept, and, as there was a strong wind blowing, he closed the doors. After starting the engine he proceeded with his repairs. Ford says that he had been working about three-quarters of an hour, when he suddenly became dizzy and passed into unconsciousness. The exhaust from the engine, with the escaping gas from the cylinder, had overcome him.

"There was no strong odor," said Ford. "just the ordinary smell of the gasoline. I was missed from the house some time after, and when my people came to search for me they were almost overpowered by the smell of gasoline fumes when they opened the doors. They im-

mediately sent for three doctors, and after quite a long time they succeeded in reviving me. When I recovered I felt just as though awakening from a sleep—no headache, no sickness, or any of the usual accompaniments of gas poisoning.”

#### AUTOMOBILE TOPICS, ILLUSTRATED

Automobile Topics is the title of an illustrated, weekly periodical, devoted to automobilism, number one of volume one of which has just made its appearance under date of October 20. It is attractively gotten up, with a two-color cover and is about the same linear dimensions as The Motor Age. The weekly is edited and published by E. E. Schwarzkopf, late editor of the New York Automobile Magazine. The new periodical has an avowed leaning towards the society feature of automobilism. It likewise shows a tendency, as did the Automobile Magazine, to devote a considerable amount of space to automobile topics and automobile construction of the foreign countries.

Automobile Topics, by the way, is the second weekly publication in its class to start in New York City, within a month, making the third in that city, not to mention monthlies. There are now five weekly publications in the field, five monthlies, and no end of bicycle, carriage, electric and other class publications that are striving for the advertising patronage of the automobile builders.

#### WHERE IGNORANCE IS BLISS

A few days ago the writer stood on the curb in front of the establishment of the Cleveland Automobile & Supply Co., examining a new Elmore vehicle of the gasoline type, equipped with a two-cycle motor. Two well dressed gentlemen stopped in front of the machine and engaged in a discussion as to its appearance. One of them said: "That seems to be a steam vehicle. You see there is the exhaust," pointing to the muffler.

"No, I think you are wrong," replied the other. "I am certain it's an electric vehicle." With that he lifted the rear flap covering the motor and, pointing to the row of little batteries used for

sparkling purposes, said with an air of superior knowledge: "You see, I am right; there are the batteries and here are the wires leading to the motor."

"Yes, I confess you are correct," said the other, and they both went away satisfied. Some day they will know better, but the incident showed that they were interested and were willing to learn if given an opportunity.

#### MR. WEISS TAKES EXCEPTION

George L. Weiss, of Cleveland, takes exception to the statement that appeared in The Motor Age, to the effect that he indulged in a race in that city. He says that, as an officer of the Cleveland Automobile Club and as a stockholder of a large automobile manufactory, he has too much regard for the laws and the welfare of automobilism to indulge in racing.

#### GERMAN MOTOR MISCELLANY

The unqualified success of the Berlin-Aix la Chapelle road race has given rise to a large number of new propositions and suggestions for next season's racing, but the only plan which has met with approval at this early date is the suggestion to arrange a monster contest from Paris to Berlin via Aix la Chapelle. The different motor-vehicle unions have placed this subject on their debating lists, and some conclusion will be reached in the near future, as an event of this importance needs extensive preparation.

The Mid-European Motor-Car Society has, according to latest statistics, 579 members. The Berlin-Dresden motor-vehicle tour, September 28 and 29 in honor of the annual meeting of this association brought out many members from all parts of Germany. The Dresden meeting was marked a number of interesting and attractive festivities.

A Berlin factory has furnished the government with an automobile for the Chinese expedition. It is to carry the necessary material for wireless telegraphy operation. The motor used not only supplies power for the machine, but it is to be utilized as well for driving a small dynamo which is to generate the electri-



cal current needed for the telegraph operations. This combination certainly demonstrates that progress is on the way.

King Alexander of Servia is the latest royal patron of the automobile, and is at present putting in all of his spare time scorching up and down the hilly roads in the neighborhood of his capital at break-neck speed.

#### A MILLIONAIRE'S IDEAL

Clarence W. Dolan, one of Philadelphia's prominent business men and a millionaire several times over, has fallen a victim to the "auto" fever. His country place is located at Towesdale, about ten miles above the city on the banks of the Delaware, and he needed a machine that could cover the distance between his home and his office in at least as good time as the suburban trains make. He is a believer in electricity and ordered an electromobile of the highest possible traveling radius with the least possible weight. The vehicle, which was delivered to him at his Newport (R. I.) cottage recently, and was given several trial trips there. It is said to meet all requirements, the makers claiming that it can attain a speed of twenty-five miles an hour and maintain it for upwards of four hours on one charge of its batteries, and this despite the fact that it is considerably lighter than the majority of electric vehicles of lesser power. The body of Mr. Dolan's new machine is long and narrow, and set low, so as to offer very little wind resistance when running at speed.

#### NOTES OF INTEREST

The earl of Carnarvon was recently fined for fast riding, at Kingsclere, England.

The park commissioners of San Francisco have adopted an ordinance which allows automobilists into Golden Gate Park, where the profaning horseless vehicle has hitherto been forbidden. One by one the gates open to the irresistible

march of the inanimate, yet animated motor vehicle. Next?

Fire Chief Bleber, of Poughkeepsie, N. Y., is the latest convert to automobilism.

Philadelphia capitalists are preparing to establish an auto omnibus service at Williamsport, Pa.

An up-to-date couple in Glen Rock, Pa.—Levi Gerbrick and Rebecca Trout—were on Thursday last united in marriage while seated in an automobile.

An effort is making among the University of Pennsylvania chauffeurs to organize a Red-and-Blue Automobile Club, with the view of ultimately promoting a series of intercollegiate automobile races.

Every self-propelled vehicle in Philadelphia is now tagged, the carrying of the number being compulsory in the Park. The majority of the vehicles, however, are decorated with their numbers at all times, the tag being comparatively small, and interfering little, if at all, with their appearance.

The Automobile Club of France has decided to join hands with the German Automobile Club in promoting an automobile race between Paris and Berlin. Count Talleyrand-Perigord, vice president of the German club, has announced that the Kaiser intends to donate 50,000 francs for prizes for the race.

It is reported that an automobile line will be established at Sea Cliff, Long Island, operating between the village proper and the railroad station, which is at quite a distance. The fare will be fifteen cents for the round trip, as against twenty cents demanded by the owners of the present line, operated by horse power.

Joseph S. Gibbs, according to a Michigan paper, purchased a locomobile in Chicago, and, in company with W. L. Hibbard, an expert connected with the Locomobile company, left Chicago one recent Friday afternoon at 4 o'clock and reached Coldwater, Mich., at 8 o'clock the following morning, having covered a distance of 155 miles.

## STEAM TRAFFIC AUTOMOBILES

It has long been inexplicable to more than one person who watched the growth of the American automobile industry, that there have been so few persons who have given attention to that most important department of the industry, the construction of wagons for heavy traffic purposes. It takes no deeply mechanical mind to grasp the fact, that any saving in dollars and cents, that can be demonstrated to the big business firms of the country, will receive careful and respectful consideration. In Great Britain, the attention of constructors was early turned towards the manufacture of vehicles for strictly utilitarian purposes. Nor was the fostering of what is destined to be a great—probably the greatest—factor of the automobile industry, confined to manufacturers, in the mother country. The Liverpool Self-Propelled Traffic Association was formed, to promote trials of efficiency, to collect data of value in the manufacture of heavy vehicles and to foster the infant industry in every possible manner. The result has been remarkable progress.

In America, it has been different. Almost the entire attention of manufacturers has been devoted to the production of pleasure vehicles, or, at least, vehicles for the carrying of passengers. It is particularly gratifying, therefore, to note that strictly commercial vehicles have not been entirely neglected. With this, by way of introductory, the matter in hand will be taken up.

Paul H. White was formerly the chief engineer of the Indiana Bicycle Co., now the Waverley branch of the American Bicycle Co., builders of the well known Waverley motor vehicles, which Mr. White designed. He is now at the head of the Paul H. White Engineering Works of Indianapolis, which firm is devoting its energies to the building of steam automobiles for heavy city traffic, in the designing and perfecting of which Mr. White has spent three years.

The accompanying illustration gives

an excellent idea of the general appearance of the White vehicle of the smaller size, designed to carry a load of 4,000 pounds. The vehicle may be used as a truck, or a body to suit the ideas of purchasers will be fitted over the rear portion of the floor. The vehicle is 17 feet long, 6 feet 8 inches wide, and 9 feet high, in extreme dimensions. The floor is 46 inches above the pavement and has an area, available for freight, of 68 square feet. The wheels are 40 inches in diameter and are constructed with steel tires and steel, self-oiling hubs. The body overhangs all four wheels. The frame is made of structural steel with few joints, which are reinforced.

The boiler is of the marine, water tube type. It is claimed to be a rapid steamer, easily cleaned and very economical of fuel. It is tested to 450 pounds per square inch for a working pressure of 175 pounds. The water level is maintained automatically, requiring no attention except to see that the water supply tank under the rear of the vehicle is kept filled. Water can be supplied to this tank by means of a hose and steam siphon in five minutes from any convenient hydrant, tank or stream. The fuel used is coke, as being the most economical. The absence of any smoke stack will be noted in the illustration.

The boiler is in the center of the cab, is protected from extreme radiation. The operator's place is at the left hand of the boiler. On the other side there is a place for a helper, if one is desired. The fuel bunker extends across the entire front of the cab and opens at the bottom, in front of the driver. It is made of sheet steel.

The engine is of the four-cylinder, single acting, compound type, so constructed that steam is turned into all four cylinders at boiler pressure when starting, to give a powerful torque. It is placed well to the rear and is entirely enclosed from dust and thoroughly lubricated. The company make a point of the fact that there

is no packing of any sort and no joints exposed to high pressure steam.

The transmission gearing is simple and is all located under the floor of the vehicle. The usual differential gear runs in an oil bath. The normal speed is five miles an hour and a special reduction

lines for a carrying capacity up to 12,000 pounds. They will also build beer wagons, brick tip wagons and heavy trucks for various commercial purposes, as well as omnibuses to carry from fifteen to twenty-five passengers, with baggage.

In a small pamphlet which the com-



THE WHITE STEAM TRAFFIC WAGON.

gear is provided for hill climbing and heavy roads. The control of the transmission is accomplished by means of a single lever. By pushing this lever forward, the vehicle is given a forward motion. By pushing it backward, the vehicle is backed. The steering is done by means of a hand wheel.

In addition to the vehicle described, the company build vehicles on similar

pany have gotten out, they give some very interesting figures as to the saving that can be effected by the use of their automobile wagons, as compared with horse drawn vehicles of similar carrying capacity. No extravagant or ill founded claims are made, although the figures show an annual saving more than 15 percent by the use of the automobiles, a saving worthy the attention of any concern.

## THE IMPRESSIONS OF A NOVICE

A NEW YORK NEWSPAPER MAN TELLS HOW IT FEELS TO THREAD THE TRAFFIC OF THE METROPOLIS AT HIGH SPEED AND TO RIDE AT A TWO-MINUTE GAIT ON AN OPEN ROAD

"So you want to take a ride in a racing automobile, do you?" asked Peter J. Fisher, Jr., the government "auto" expert, when approached by a New York Tribune reporter, who desired to find out the secret joys of the new sport.

"Ever ridden in one before?" he continued.

"Have taken \$1 worth of ride in an electric cab," was the answer, at which Fisher put up his nose in dignified disdain of the eight miles an hour.

"Well, you'll have to be broken in before we hit a speed, and I don't know anything better to do it than a flying trip through the business district."

He brought around a little gasoline runabout, with thin wheels and a highly enameled box, with no disfiguring machinery hanging between the hubs. The "auto" looked like a thoroughbred, and weighed only five hundred pounds. There were only two levers, one of which regulated the speed and applied the brakes, and the other steered the front wheels.

### The Start

There was no fussing or fuming at the start. This "auto" was ready, and went ahead with a musical whirr, which soon became almost noiseless. The first stretch of the breaking-in process was over the crowded and torn up streets from the City Hall to the Battery, in Broadway. Fisher's foot was continually on the bell, and his steering lever moving from right to left as he dodged around street cars and took chances in darting ahead of heavy trucks. Four or five times on a block a swerve which almost unseated one was necessary to avoid some heavy thinker who refused to pay attention to the bell. In every case they jumped back with a frightened air as the vehicle just missed them. The policemen at the corners looked on with a smile. They knew Fisher as the man

who broke records with the postoffice automobile collecting wagons, and they trusted him.

### Disgust of the Teamsters

After doing "stunts" in Wall street, to the amazement and disgust of the teamsters, who could not understand how a heavy automobile could make waltz revolutions on the slippery pavement without turning over, Fisher started out to break his record for an uptown run.

"In fifteen minutes we'll be at the Grand Central Station, and if you live through that I'll take you for a racing run," he said as the machine started off at a frightful speed, considering the crush of vehicles and that the crossings were black with people. Fisher has a way of steering without using his hands which causes much alarm to the people who witness it. As he crossed one of the side streets, two well dressed women jumped back, considerably frightened. The operator raised his hands as one sometimes does in prayer.

"Good heavens! Jane, we were nearly run over," said one of the women. "The man was praying for us."

### Speed Under Difficulties

It was necessary to run around two blockades before the machine reached a straightaway course in Park Row, and swung around into the Bowery. The operator made up for it, however, whenever there was a clear road ahead and the station loomed up in just fourteen minutes from the time the "auto" left Wall Street. There seemed to be less traffic in the upper part of the city, and the run from Forty-second Street to Sixty-sixth Street and Broadway was made in four minutes. The reporter had managed to hold to the machine on this trip, and the operator was ready for the racing experience.

It is not an easy thing to find a place



to race an automobile in New York. Central Park is closed to all sorts of power carriages, and there are too many horses on the speedways. Across in New Jersey the Hudson County Boulevard furnishes a straight course for fifteen miles of comparatively level road.

#### Ready for Real Speed

The automobile ran smoothly over the hard road, and was soon warm enough for a speed trial. Blue goggles were provided for protecting the eyes, and hats were carefully tucked under the seat.

"Hold on tight! Keep up your nerve! Don't grab at any of the levers! Don't try to jump overboard! Don't faint!" These and other instructions were flung out by the operator from time to time, as the speed of the machine increased.

"All ready now. Hold on!" he exclaimed, at last, and the race against time began.

The machine had hardly started when he swung the brake. There was a whirr of sand, as the wheels dug into the road, and a sliding, slipping, swaying motion which threatened to turn the vehicle on end at any moment. Then she stopped with a jerk that made one want to go over the low dashboard and set his nose and ears ploughing furrows in the road ahead. A team was coming and it was dangerous to try to pass them at full speed.

#### On a Clear Road

When the road seemed clear again another start was taken and the machine was soon doing her best. There seems to be a peculiar sort of happiness about making fast time on an ocean greyhound or a flying express train. It is the same with automobile racing, except that one seems to be taking a more personal part in it. There are other ways of telling how fast one is going than by looking through coal smoked windows at swiftly passing telegraph poles, or counting the waves through the port-holes of steamer staterooms. One hears the sand flying and a quiet, tearing sort of a rip as the rubber tires whirl the auto along. The trees alongside the road look like so many yards of green colored

stuff banked up on either side. The air comes into the face with a force that makes breathing difficult. One clinches his teeth and opens the lips ever so little while the air rushes in. It feels as if he were going to burst when the lungs fill up, but with a choking gasp he manages to exhale and start another breath. One's hands develop a terrible grip, and he almost looks for his finger prints in the hard iron when it comes time to let go.

#### Dangers Are Magnified

The machine was on the last lap of the mile and fairly flying, when a rock loomed up in the road a bare fifty yards ahead. It was not a big rock, but it seemed to grow bigger as the machine rushed upon it, and one could not help thinking how little a thing it would take to upset. The operator didn't seem to mind, but the nerves of the novice tingled. Then, after a gasp that was almost a cry, the rock was past, the wheels having straddled it. It was when the mile was nearly over that one's ears began to buzz and hum with all sorts of strange things.

#### A Two-Minute Mile

Almost at the very end of the mile there was a sharp curve in the road which looked extremely dangerous and the flying "auto" tore down upon it. The operator did not slacken speed in the slightest, but he did run toward the gutter for the purpose of getting the largest possible angle on the curve. Two wheels went skyward as the machine started to take the curve. The other two were grinding small gutters in the road and sending out clouds of dirt. Fortunately, the road was dry, and the other wheels held, but it was a ticklish two seconds, and they seemed five minutes.

"What was our time?" was the first question. Fisher looked at the watch and grumbled: "One fifty-eight; not so bad, considering everything."

"It was fast enough for me," declared the reporter.

"It was not so fast," remarked Fisher. "I have done fifty-eight miles in an even hour with a big racer over the roads near Vienna."

## THE REGAS MOTOR BICYCLE

The Regas Vehicle Co. of Rochester, N. Y., after thorough tests of experimental machines, has formally introduced the Regas motor bicycle. This machine is the creation of J. H. Sager, well known in connection with Sager bicycle saddles

ceive a  $1\frac{1}{4}$ -horsepower motor and when completed comprises a much lighter machine than the first, as the weight of the entire bicycle will not exceed seventy-five pounds. Equipped with a  $1\frac{1}{4}$ -horsepower motor it will be capable, it is stated, of



THE REGAS MOTOR BICYCLE IN USE.

and the Sager roller-pin driving gear for bicycles.

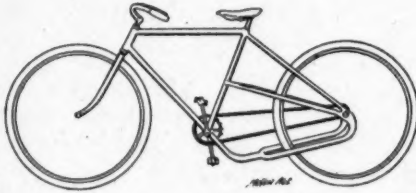
The Regas machine shown in the double column illustration herewith is a special one built for experimental purposes and is somewhat heavier than the regular model. It is fitted with a  $2\frac{1}{4}$ -horsepower De Dion motor and has shown itself to be both steady running and speedy. On a flat rough horse track it recently covered a mile in 1:57. The regular Regas frame, as shown in the single column illustration, is adapted to re-

ceive an average road speed of twenty miles per hour.

The distinctive feature of the machine is the specially designed and unique frame which allows the motor to be supported low down and behind the rider. This location of the motor not only tends to make the bicycle steady running by lowering the center of gravity, but it allows heat and fumes from the motor to pass to the rear without striking the rider.

The transmission of power is so ar-

ranged that the rider can assist the motor by pedaling if he desires and can also propel the machine entirely by the pedals. The first provision is advantageous for climbing extremely steep hills or running at excessive speeds and the second affords the means whereby the rider can propel his cycle home should accident



Regas Motor Bicycle Frame.

render the motor temporarily useless. During regular motor-propelled running the speed is readily varied to suit the operator by timing the ignition.

In speaking of the Regas frame its makers call particular attention to the fact that the situation of the motor and its top and bottom support furnish ample protection from accident. This frame is patented and, as is obvious, may be used in either single or tandem motor bicycle construction. It may also be adapted to tricycle construction by using two rear wheels with a differential gear between the rear forks. By hitching the frame to a two-wheel front frame a double seated tricycle with single driver, and hence no differential, may be obtained.

In this machine all of the bicycle parts with the exception of the crank hanger, rear hub and rear forks are regular stock parts. Regas company is ready to negotiate with bicycle manufacturers to make the motor bicycles on royalty, or to furnish the parts complete or any portion of the entire set.

## THE HOWARD GASOLENE MOTOR

The accompanying illustrations give two views of one of the latest types of Howard four-cycle motors, manufactured by the Grant-Ferris Co., of Troy, New York. The makers claim for this motor that it is a distinct American pattern, and is not a copy of any foreign machine, and in its production the designer did not aim to see how cheap a motor he could build, but that the parts were arranged with a view to their durability and efficiency, irrespective of cost.

An inspection of the cuts shows the motor to be double cylinder, with the cylinders cast in one piece. A base, a cylinder head, a fly-wheel and two pistons constitute the number of iron castings. The cranks are set opposite, their reciprocating parts moving in opposite directions, making a practically balanced machine. The bearings are of magnolia metal, and occupy all the space up to the cranks. The cam shaft, which is at right angles to the main shaft, is driven by

spiral gears. These, as well as all bearings, including the guides of the valve stems and rolls on their ends, are thoroughly lubricated from the base. The base being open at the top, allows connection from one side to the other, and there is no resulting crank chamber pressure due to the piston displacement, as the displacement of one is taken up by the other.

The first illustration shows the motor complete. The valves in the head are large and light. The guides on the stems are long, and the valves, themselves, can be easily removed. The cylinder head is water jacketed, and the water surrounds the valve seats. Water also surrounds the sleeve through which ignitor shaft turns, which prevents it from overheating and sticking. The space between the bolts and the ignitors in the head are cored, so as not to connect with the water space. The exhaust cavity is large, and is beneficial in keeping the

motor free from back pressure at high speeds.

The end view of the motor, which can be seen in the company's advertisement, on another page, shows it to be free from projecting valve chambers, cam shafts or

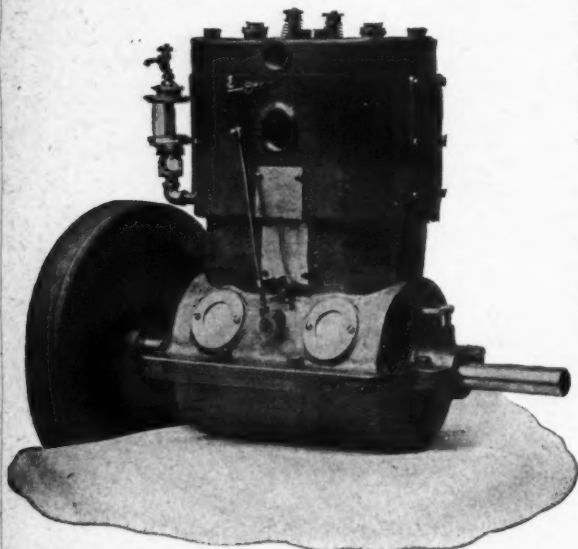
out of alignment, a frequent difficulty.

The ignitors are very simple, the inner ends being provided with Baker's platinum. The outer parts are of steel, hardened.

Means are provided for varying the time of the spark while the motor is running. The piston has three rings with joints cut square as shown. The lower ring being especially beneficial in preventing too much oil from working by the piston.

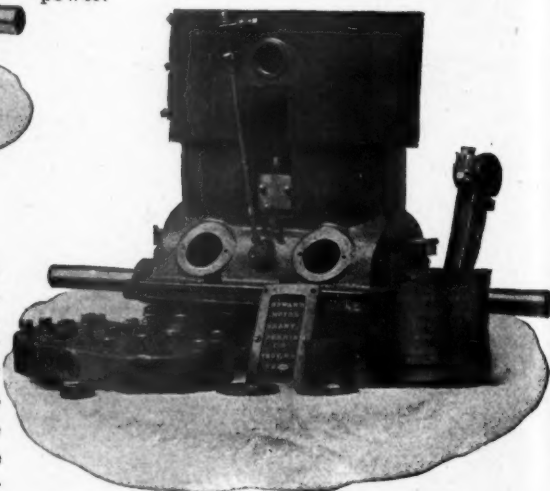
The construction of the connecting rod is especially strong, and leaves ample room for the clamping bolts and lock nut.

This particular style of motor is built in two sizes,  $4\frac{1}{2} \times 4\frac{1}{2}$  and  $6 \times 6$  inches, giving, respectively, five and ten horsepower.



The Howard Gasolene Motor.

gear cases. There is also illustrated a view showing the motor with pistons, cylinder head and crank plates removed. The water jacket extends completely from one cylinder to the other, passing between the valve stems as shown in the cut. The guides on the exhaust valve stems extend from the lower part of the opening to about the middle of the exhaust hole. Part of this guide is surrounded with water. The lower end of the exhaust valve stem goes into a square steel block, and is securely held with a lock nut. By unscrewing this lock nut the valve can be withdrawn. The guide for this valve stem is cast solid with the motor, and is therefore not liable to get



The Howard Motor, with Piston, Cylinder Head and Crank Plates Removed.

The company also manufacture a line of horizontal motors with single cylinders and opposed cylinders, for carriage work, also two-cycle motors for marine purposes.



[illegible]

**Motor Age**

# CONSTRUCTION OF A MOTOR VEHICLE

THE PRACTICAL CONSTRUCTION OF A MOTOR VEHICLE ADAPTED FOR USE IN CONNECTION WITH  
THE FOUR-HORSEPOWER GASOLINE MOTOR ALREADY DESCRIBED IN THE MOTOR AGE  
BY L. ELLIOTT BROOKES

## PART IV.

This chapter concludes the description of the transmission mechanism proper, showing the secondary shaft and its bearing brackets, as well as the auxiliary shaft, with its gears and brackets.

The secondary shaft, which is cut in

respond with the one made by the connection of the differential gear casing to the other end of the secondary shaft through the medium of the transmission gearing shaft. This flexible joint is made, as shown, with a steel sleeve into which

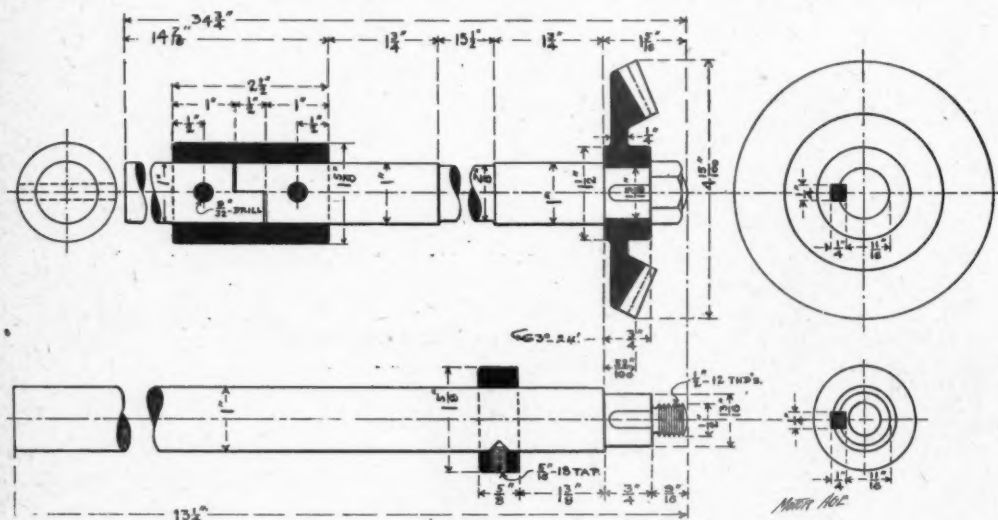


FIG. 25.—SECONDARY SHAFT.  
1—Complete.

### DIFFERENTIAL GEAR BEVEL GEARS 2—Steel.

4-inch Pitch Diameter.  
24 Teeth—No. 6 Diametral Pitch.  
Pitch Line Angle—63 degrees, 24 minutes.  
Face Angle—67 degrees, 59 minutes.  
Cutting Angle—59 degrees, 30 minutes.

two at the center of the differential gear casing, is plainly shown in Fig. 25, with one of the two bevel gears which are part of the differential gearing, the case of which is shown in Fig. 11. The long part of the secondary shaft is again cut at the side of the transmission gearing shaft, opposite to that upon which the differential gear casing is carried. This is done for the purpose of making a flexible connection at this point, so as to cor-

respond with the one made by the connection of the differential gear casing to the other end of the secondary shaft through the medium of the transmission gearing shaft. This flexible joint is made, as shown, with a steel sleeve into which

and the bevel gear which is secured by a feather key to the inner end of the shaft, and locked in place by a semi-finished

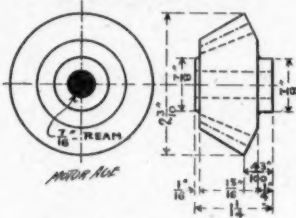


Fig. 26.—Differential Gear Bevel Pinions.  
3—Steel.

2-inch Pitch Diameter.  
12 Teeth—No 6 Diametral Pitch.  
Pitch Line Angle—26 degrees, 36 minutes.  
Face Angle—31 degrees, 11 minutes.  
Cutting Angle—21 degrees, 42 minutes.

hexagon nut. The bevel gear on the long part of the secondary shaft is similarly keyed and locked to the end of this part

shaft shown in Fig. 25, is 19 inches, the same as the distance between the bevel gear and the steel sleeve on the long end of the secondary shaft. This maintains the secondary shaft with its bevel gear in proper relation with the hollow trans-

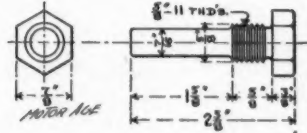


Fig. 27.—Bevel Pinion Studs.  
3—Steel.

mission shaft, and with the hub of the differential gear casing which is carried on the end of the hollow shaft.

Fig. 26 shows the bevel pinions for completing the differential gear mechanism. They are of steel and should be

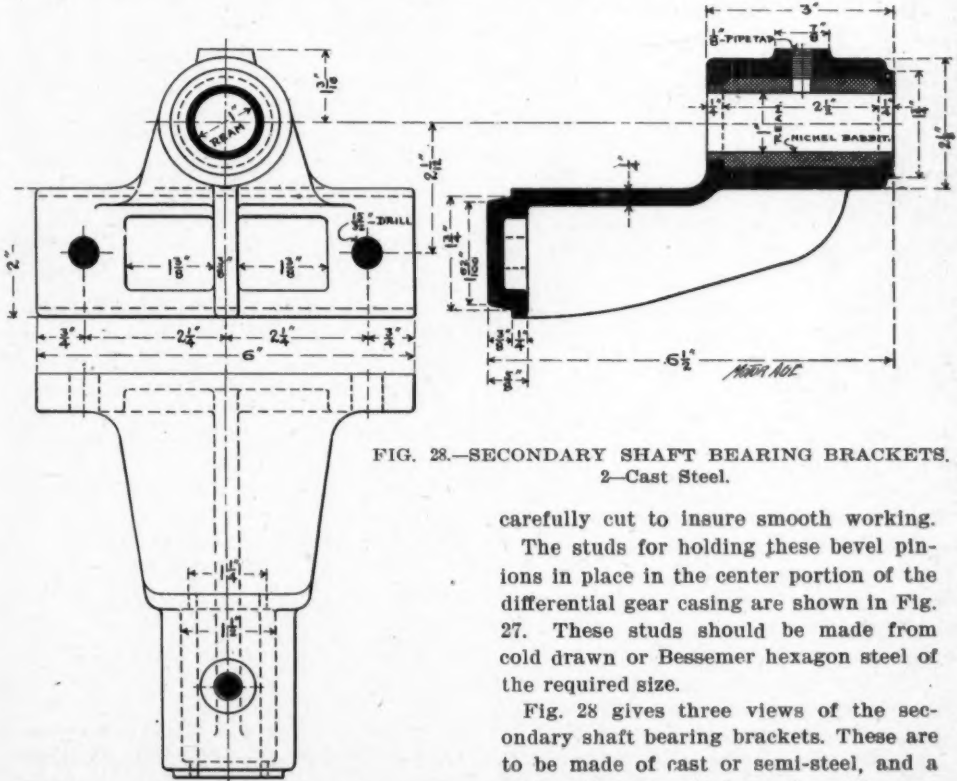


FIG. 28.—SECONDARY SHAFT BEARING BRACKETS.  
2—Cast Steel.

carefully cut to insure smooth working.

The studs for holding these bevel pinions in place in the center portion of the differential gear casing are shown in Fig. 27. These studs should be made from cold drawn or Bessemer hexagon steel of the required size.

Fig. 28 gives three views of the secondary shaft bearing brackets. These are to be made of cast or semi-steel, and a neat pattern should be made, with core-box for the babbitted recesses for the bearings.

To fit up these brackets properly, and to have them in such shape that the bab-

of the shaft, as shown in the drawings. It will be seen by examining Fig. 11 that the length of the hollow transmission shaft, which surrounds the secondary





It should also be of cast steel. The holes for locating this bracket on the frame are not shown in the frame drawing in Fig. 5, for the reason that it is considered best to put the cone clutch lever (Fig. 29) in

Fig. 34 shows the swivel for the long arm of the cone clutch lever shown in Fig. 29. This should be made from  $1\frac{1}{2}$ -inch, round, cold drawn or Bessemer steel. The length on the 9-16-inch part of

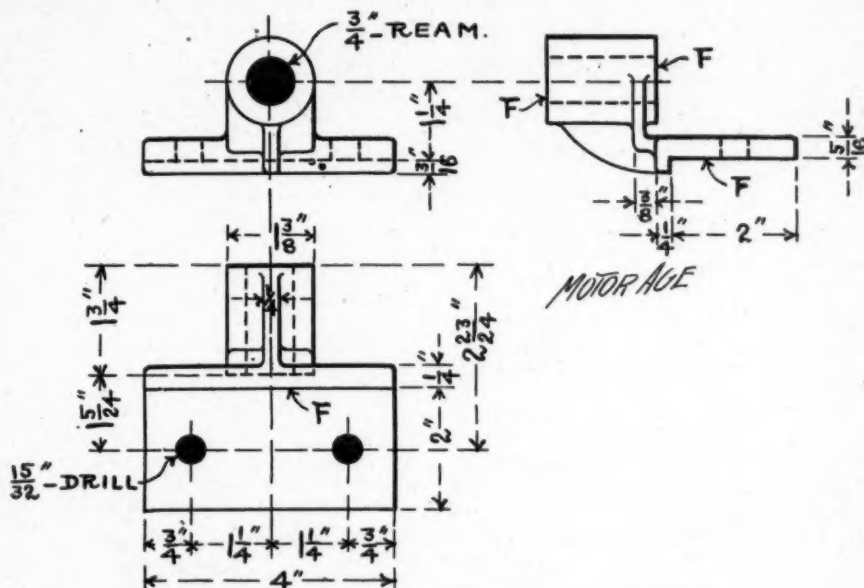


FIG. 32.—CONE CLUTCH LEVER BRACKET.

1—Cast Steel.

place with its yoke (Fig. 30) in place, and then locate the holes on the frame by marking through the holes in the cone clutch lever bracket (Fig. 32). If there should be any slight discrepancy in the alignment of the transmission gearing it can, in this manner, be allowed for, in the locating of this bracket.

Fig. 33 shows the pin for holding the

the swivel, which goes in the holes in the long arm of the cone clutch lever, should be a trifle longer than the figure given in the drawing, to allow of easy movement.

The bracket which carries the auxiliary driving shaft is shown in Fig. 35. This should be made from a good quality of cast iron. Two patterns are needed, one



Fig. 33.—Cone Clutch Lever Bracket Pin.

1—Steel.

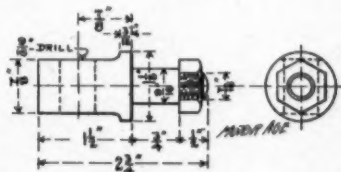


Fig. 34.—Cone Clutch Lever Swivel.

1—Steel.

cone clutch lever in position on its bracket. This should be made from a piece of 1-inch round, cold drawn or Bessemer steel, and should be provided with a washer and a split pin for holding it in place in the bracket.

for the cap and one for the bracket proper. A boss is provided on top for a  $\frac{1}{4}$ -inch pipe tap, for a solid grease cup, which should be about  $1\frac{1}{4}$  inches, outside diameter of body. The cap is held in place by four 7-16-inch hexagon head cap

screws, 2 inches long. The bracket is bolted to the angles h and i of the frame by means of six  $\frac{3}{8}$ -inch bolts, with hexagon nuts. These bolts are  $1\frac{1}{4}$  inches long.

pose. The keyways are both of the same depth, as shown in the end view of shaft.

Fig. 37 is the rawhide pinion which goes upon the rear end of the auxiliary driving shaft. Do not attempt to pick up

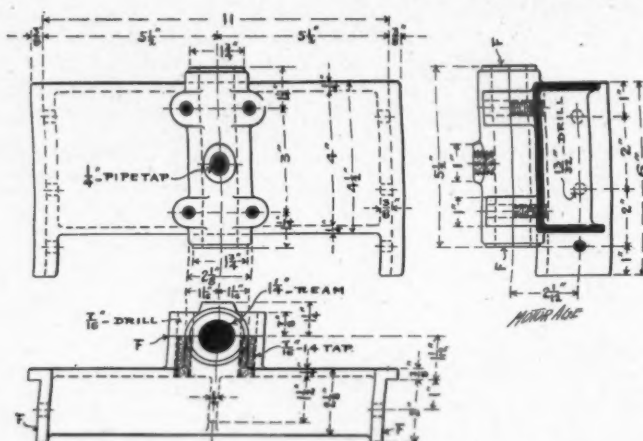


FIG. 35.—AUXILIARY DRIVING SHAFT BRACKET.  
1—Cast Iron.

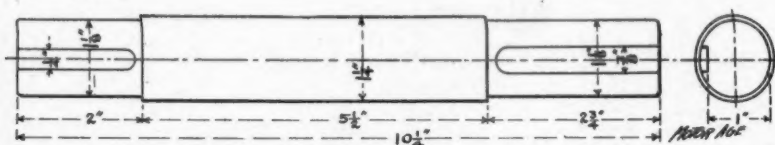


FIG. 36.—AUXILIARY DRIVING SHAFT.  
1—Steel.

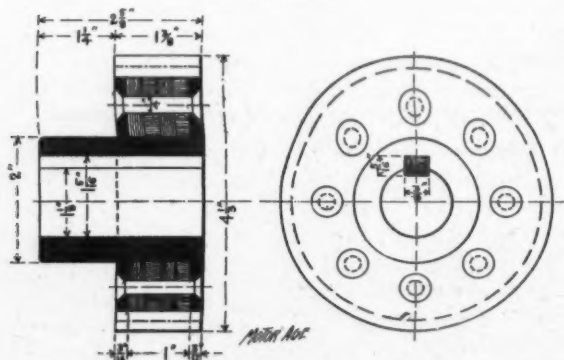


FIG. 37.—AUXILIARY DRIVING SHAFT GEAR.  
1—Rawhide with Phosphor Bronze Hub and Flanges. (Allow Finish All Over.)  
4-inch Pitch Diameter.  
24 Teeth—No. 6 Diametral Pitch.

Fig. 36 shows the auxiliary driving shaft, which is carried by the bracket just described. This should be made of steel. If carefully centered, a piece of cold drawn steel may be used for this pur-

a ready made rawhide gear to use in place of the one shown, as it will not give any satisfaction, as, consisting simply of two brass flanges, with rawhide between, and no hub (as shown in the drawing), it

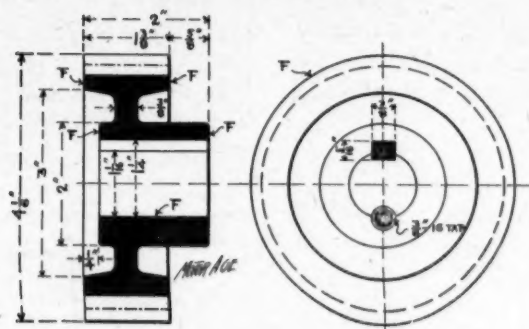


FIG. 38.—CRANK SHAFT DRIVING GEAR.  
1—Phosphor Bronze. (Allow Finish All Over.)  
3 5-6-Inch Pitch Diameter.  
23 Teeth—No. 6 Diametral Pitch.

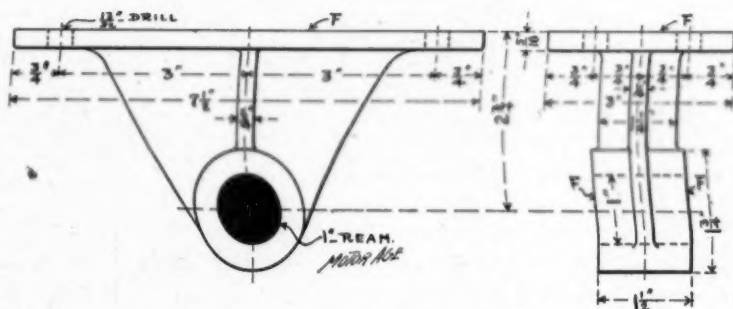


FIG. 39.—CONTROLLING LEVER BRACKET.  
2—Cast Iron.

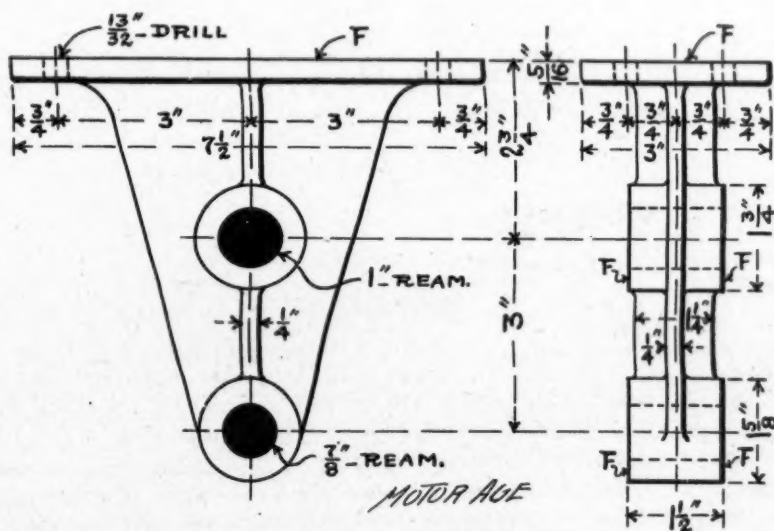


FIG. 40.—BRAKE LEVER BRACKET.  
1—Cast Iron.

will go to pieces in a short time from the force of the explosions of the motor, while a rawhide pinion of the construction shown in Fig. 37 has stood the test of hard usage, and is the only style that the writer has found that would stand such usage. A gib headed key should be made to hold this gear on the auxiliary driving shaft, with a taper of about  $\frac{1}{4}$  of an inch

done until the gear is fitted upon the feather key and ready to stay there. Then the screw hole should be drilled and tapped, and the cap screw made a very tight fit in this hole. A clearance drill should be run into the hole a little way after tapping to allow for the body portion of the cap screw under the head.

Figs. 39 and 40 show the brackets for

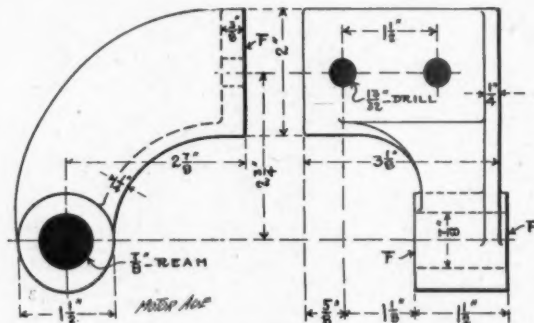


FIG. 41.—BRAKE LEVER SHAFT BRACKETS.

1 Right Hand—Cast Iron.  
1 Left Hand—Cast Iron.

to 1 foot on the top side of the key, and should be made a nice snug driving fit.

Fig. 38 shows the gear which goes upon the crank shaft of the motor. It should be made of phosphor bronze. It is held upon the end of the crank shaft by means of a feather key and a  $\frac{3}{8}$ -inch, hexagon head, cap screw,  $\frac{3}{4}$  of an inch long, located diametrically opposite the feather key, half in the shaft and half in the hub of the gear as shown. This should not be

carrying the speed controlling lever shaft. These are to be made of a good quality of cast iron. The lower hub on Fig. 40 is for carrying the brake operating mechanism.

Fig. 41 shows the brackets for carrying the lower brake lever shaft, which actuates the wheel brake and fast speed brake. Two patterns are needed for these brackets, one right handed and one left handed. They are of cast iron as before.





# ABOUT MOTOR SPEED AND CHANGE GEARS

A STUDY OF PROBLEMS INVOLVED IN REGULATING THE SPEED OF MOTOR VEHICLES BY CHANGING THE SPEED OF THE MOTORS.

BY M. C. KRARUP

## PART II.

Being alone to handle his 1,200 pound vehicle he grew cautious at the thought of being compelled to put the brake on, at any point of the little 5 per cent grade in front of him, to prevent the vehicle from rolling down backwards. He did not care to move at all until he felt sure that he could get through. Having become thoroughly convinced that he could not possibly climb the hill at a twenty-mile gait, because the air resistance at that speed would consume about two horsepower, to judge from his experience on level roads, the gradient would require 3.1-3.3 horsepower and the traction 3 horsepower, and he had only 5.4 horsepower available after deducting friction from his 6 theoretical horsepower motor—it seemed more and more doubtful if the reduction in air resistance at a lower speed would help him out sufficiently. The proposition slowly took form in his mind, that a gasoline motor-vehicle unprovided with a slow speed gear change, if it could climb a certain grade at all could take it at its top speed, or in other words, if it could not get up the hill at its highest speed could not get up at all.

### In a Dilemma

Supposing he should try at a five mile gait, just one-fourth of his highest speed. The air resistance would be reduced to 1-16 of the two horsepower or 1-8 horsepower; the grade would require one-fourth as much as before or nearly one horsepower, and the traction also one-fourth, or  $\frac{3}{4}$  horsepower, in all nearly 1.7-8 horsepower. But his motor would only be running at 200 revolutions and would develop only one-fourth of 5.4 horsepower, or about 1.3 horsepower. There was evidently a deficit. Further figuring gave the same result for a  $2\frac{1}{2}$  mile gait, and even for a  $1\frac{1}{4}$ -mile gait. The deficit in power followed him.

He now saw that grade and traction resistances being proportionate to speed and the power also proportionate to speed, the reduction in air resistance could not possibly help him unless he had power enough in his motor to at least overcome grade and traction resistances at any speed and the highest grade that he thought it necessary to consider. Only in that case would the reduction in air resistance by a speed reduction help him to a surplus of power for hard slow work. This motor was 6-horsepower; it evidently should have been 9-horsepower for a five per cent grade and more than 12-horsepower for a 10 per cent grade; and even then he would be obliged to keep the whole vehicle with the added power within its present weight of 1,200 pounds and would not be able to make more than his allotted speed of twenty miles an hour on level ground, unless he increased his motor speed. Considering that the wind sometimes blows at the rate of forty miles per hour, it might even be safer to raise the motor to 15-horsepower.

### A Question of Horsepower

Then arose to his vision the question of hauling a load. His neighbors had spoken to him about hauling a ton of goods and had asked him if he expected to be able to do that kind of work as well as with horses, and he had answered: "Of course; it can do anything horses can do, and more too, if it is built for it." Well, that was the kind of wagon they wanted, they thought; something that they might use in the same way as an ordinary spring wagon, sometimes for pleasure and sometimes for light hauling.

### Visions of Immense Power

The required horsepower rose mentally to giddy heights. Twenty-five did not seem at all excessive; all the time under

the supposition that he was to avoid change speed gearing.

The praises bestowed upon him and his creation for its work in the level, hard roads, quickly melted into insignificance. He put them away from him with a hard, determined gesture right then and there, while stopped by the earnestness of his meditations midway between a little hill that he could not possibly scale and a sandy stretch which it now seemed he had cleared only by a miracle. There was no other outlet; he had to turn around and in some way get through the sand again. Lucky that he was not called upon to figure out the best speed, for he had no definite idea as to what particular speed would contribute to settling the sand under the driving wheels while yet leaving him enough power. But that would regulate itself automatically, either for good or bad; and he consequently proceeded to turn homeward.

#### Some Serious Reflections

Barring a short stop which he finally got over by releasing his driving gear and accumulating speed in his motor and then connecting the gear again, and repeating this performance until the sand packed somewhat, he reached good roads without serious trouble, reflecting the while upon the solid comfort of having all one's horsepower available when compelled to go slowly. This was after all only a return to his own previous convictions, but immensely strengthened by actual experience.

#### Thinks of Speed-Changing Gears

Confronted, by his own reasoning, with the prospect of providing a 25-horsepower engine for a 1,000 pound vehicle and the utter impossibility of operating so large an engine as far below its highest capacity as would be necessary for slow work on good roads, variable speed gear devices began to loom up in his vision as the only instrumentality for the salvation of automobilism and lost their previous aspect as necessary evils and a deplorable incumbrance. If the motor would have to be larger than he had thought it would plainly be advisable to have a high speed gear as well as a normal and a low speed gear, or else he

could not have the full power for normal speed on heavy roads or with a moderate load, and there were undoubtedly cases when people would want to drive ten miles per hour even though the road was heavy and the head wind stiff. He would have to make his high speed on the level hard roads at less than his motor's full capacity for power development, and gear up. There seemed no other way out of the dilemma, of whatever size he made the motor; only, if the motor was not made larger he would have to lower his top speed, even with a high speed gear; because it could not drive this high speed gear at the full power and yet have reserve power for driving the normal speed under unusual resistance.

#### Impressed By Experiences

He arrived home deeply impressed with the necessity of figuring the variable gear problem out with somewhat exact reference to the work that would be expected of his vehicle and not merely by guess or in reliance upon the practice of other builders. Incidentally his esteem for the French pioneers rose several degrees, although he was still far from accepting their multi-speed gear construction as final.

#### Abandons High Speed

For all work that would be considered normal for horses he wanted his vehicle to be able to make 10 miles an hour. For all work that would be considered hard for horses, whether in speed or draft effort, he would be willing to get along with as much lower speed as necessary, and he would be willing to admit that he could not make high speed, as from 10 to 20 miles per hour, unless the conditions were favorable. Those were the data that he accepted in regard to requirements; and from necessity he accepted the 6-horsepower motor, as it was highly efficient within its range and he did not wish to build a new one.

#### Considering Real Conditions

Now, what would he be obliged to do in the way of speed change gears? First of all it was needful to examine whether the motor running at full speed would produce 10 miles per hour under the worst conditions that might be con-

sidered normal. As such he selected a hard, smooth road, a 2 per cent grade, a head wind limited to 10 miles per hour, and a load of 800 pounds, being two persons, 300 pounds, and freight, 500 pounds. This would bring the traction effort up to 75 pounds, the air resistance the same as at a 20 mile gait in calm weather; and he thought his estimate of 2-horsepower for this might be called safe though not excessive. Ten miles per hour being equal to 880 feet per minute the traction would represent  $880 \times 75$  or 66,000 foot-pound, being also two horsepower. The grade at the same speed would be 2 per cent of 1,800 pounds, or 36 pounds, multiplied by 880, making 31,680 foot-pound, or about 1-horsepower. The total making 5 horsepower would leave four-tenths of a horsepower to spare, which would be quite satisfactory.

He now had a normal gear by simply doubling the reduction of the gear he was using. At smaller resistances his flexible motor could drive this gear nicely when throttled and braked. For higher resistances he would be compelled to go slower by means of slow speed gears; and for higher speed he would also be compelled to resort to speed gears as his

motor speed limit was reached at the 10 mile gait. The only question was: Should he accept one single lower speed below 10 miles per hour as the maximum speed to be reached when resistance was greater than mentioned above? If he put it too low, it would hardly be satisfactory to his customers, and if he put it too high he would not be safe. It looked like two low speed gears below ten miles would be necessary, giving him in all four gear speeds, despite his perfect motor. He determined on 2 and 6 miles per hour as most suitable.

#### Had Worked on a Faulty System

He also saw that his system of operating the vehicle had been faulty. Save for a small margin, due to reductions of air resistance, there was no possibility of using the throttle and spark-timing device for any but voluntary speed reductions. For all compulsory speed reductions he must resort to a gear change.

Having arrived at this conclusion he set about examining into several valuable speed gear devices that had been brought to his notice, but the relative merits of which he had previously looked upon as being of comparatively minor importance.

## NEWS OF THE MOTOR INDUSTRY

### AUTOS FOR THE NEW YORK CENTRAL

New York, Oct. 20.—The New York Central Railroad or at least those prominent in it have, for some months, been investigating motor vehicles with a view of establishing not only an automobile cab service, but auxiliary freight feeders to their lines at various points from towns not connected with their lines.

The recent election of officers of the Woods Motor Vehicle Co., of Chicago, a New Jersey corporation, shows a significant personnel and increase of New York Central people in the directorate, tending to the inference that the electric cabs of the Woods company will be prominent in the railroad service to be established.

It has been well known that the preferences of these gentlemen in the line of freighting automobiles has laid in the direction of steam vehicles and it was broadly hinted to The Motor Age correspondent by a gentleman high up in their councils that the choice had finally fallen on the steam vehicles made by the Cunningham Engineering Co., of Boston, Mass.

### Contests for the Garden Show

Strong pressure was brought to bear upon the Madison Square Garden show managers to abandon the circular track for moving exhibits and contests in favor of some twelve or fifteen firms unable to secure space. It has been finally decided, however, to adhere to the original plan

of having an exhibition track. The starting, stopping and obstacle contests for steam, gasoline and electric vehicles will be decided as scheduled. Diplomas will be given to winners, except in the case of contests for electric cabs for hire and delivery wagons. A cash prize of twenty-five dollars will be given to winners in these classes.

The rules governing the obstacle and braking contests have been made familiar by trial at the recent tournaments, so it need only be said that the arrangements for timing to assure the required minimum speed will be much more carefully made than heretofore.

Starting contests for gasoline vehicles will be arranged as follows: Vehicles will be started with all parts so cold that the hand can be put with comfort on any part of the machinery. Competitors must start a certain distance away from their machines, say twenty feet, run up to them, get under way as best they can and travel the length of the straight side of the track to a line. The one reaching the line first wins. In the hat, coat and waistcoat race a competitor must start in machine, stop at a post, dismount and put his hat on it, then mount the machine and ride to another post, dismount, unbutton his coat and deposit it, then remount, ride to a third post and relieve himself of his waistcoat; then travel around the track and pick up separately the articles in question again, thoroughly buttoning his garments and riding to a line. A limit will be put to the abbreviated number of buttons on the clothing.

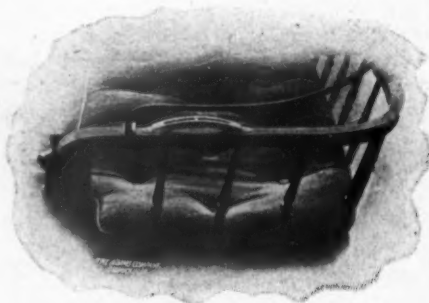
#### GASOLINE MOTORS AND CASTINGS

The Lowell Model Co., of Lowell, Mass., have issued a four-page folder announcing prices and other particulars of the two-cylinder, four-horsepower, balanced, gasoline motor, recently described in the columns of *The Motor Age*. Early in the publication of the series of articles descriptive of this motor the Lowell company announced their intention of furnishing castings for the motor, in the rough or partially machined, as well as the complete motor. The energy and enterprise of the firm is shown in the fact

that they are now prepared to furnish either castings or motor complete. The price of the complete motor is \$275, of the complete castings of motor and jigs \$60, and of a set screws and studs for bolting together, steel for gear studs, piston pin, plunger rod, tool steel for roller and cams, gears and pinions cut, sparking plugs, insulation for springs, spring stock, valve stem forgings, etc., \$20. It is almost needless to say that any one constructing the motor in small quantities will save time, worry and expense by getting the complete castings from this reliable firm.

#### MEASURING GRADES WITH A "GRADOMETER"

Very few automobilists have an accurate idea of the grade percent they can climb. If their machines go up easily they are apt to underrate the grade; while on the other hand, if it is hard



The "Gradometer"

work to get up, they are apt to greatly overrate the grade.

The grade that an automobile will climb has been as much overrated by manufacturers and users as has the horsepower that the motor would develop.

There has been no convenient instrument with which to measure the grade. Pendulums with a graduated circle have been tried, and they answered fairly well when at rest, but beside being very bulky they were unreliable when attached to a vehicle under motion. The vibration would cause the pendulum to swing back and forth so that readings could not be easily taken.

The Adams Co., of Dubuque, Ia., has just placed upon the market a little in-



strument that may be attached to the side of the seat of any vehicle or to the top tube of a bicycle, and the grade the vehicle in ascending or descending can be determined at a glance.

"Gradometer" is the name given the instrument, and it consists of a nickel-plated casing, 6 inches long, containing a curved glass tube filled with spirits, leaving a small bubble which acts the same as a spirit level.

The casing has graduations on one side of the opening, and figures from 0 to 30 each way from the center on the other side, so the percent of grade can be read from the level to 30 percent, either ascending or descending.

In one of the accompanying illustrations is shown a "Gradometer" attached to the left side of a vehicle seat. The other cut is an enlarged view showing



The "Gradometer" Attached.

the "Gradometer" on a grade of 13 1-3 percent.

A "Gradometer" is convenient to any one contemplating the purchase of an automobile. It can be carried about in the pocket, and when placed upon the ground or upon the curb the grade percent can be accurately determined. Or it can be secured to the seat of any horse-drawn vehicle, and by driving over and noting the grades in his vicinity, the intending purchaser can readily determine whether an automobile guaranteed to negotiate a certain grade would be suitable for his use. It is important to a purchaser to know whether he can get up certain hills with the machine.

With a simple, accurate, inexpensive instrument on the market that will enable any one to determine grades, an honest manufacturer need no longer hesitate

to make a guarantee of what his machine will do.

#### CREST COMPANY BRANCHING OUT

The Crest Mfg. Co., since their entrance in the automobile business more than a year ago, have confined themselves entirely to the manufacture of motors. Constant demand on the part of their customers for parts, other than motors, that go to make up an automobile, has been an inducement for them to enter into this line of business.

Having increased their facilities they purpose to manufacture various accessories that are necessary in the construction of automobiles, and will also buy from other manufacturers the best devices that are used for this class of work. They will give the customer all information by which carriages can be built without any danger of excessive cost or uncertainty of experiment, furnishing working drawings when requested.

They have made arrangements with French and English manufacturers of automobiles to introduce into this country various new features in motor carriages and accessories that are not sold here. Through their agents abroad they purpose to keep posted in regard to all new devices and accessories and will deliver same within a reasonable time from receipt of order.

This company purposes to furnish everything for an automobile, and will furnish only the standard goods, either foreign or domestic, that are meeting with success on the market. They will not handle or deal in any experiments, and for that reason they will guarantee their customers the success of the goods that they purpose to introduce.

With their increased facilities they can build a limited number of carriages at the request of their customers. The cost of building will be less than to buy on the market. They will carry out ideas of their customers if considered practicable, but would prefer to build an automobile from their own design. Parties wishing to order motor carriages built under these conditions will receive prompt attention, and will be assured that the work will be of the most satisfactory nature,

as the shops are equipped with the best tools, and none but skilled mechanics are employed.

#### THE HOLLEY MOTOR BICYCLES

The accompanying illustration shows the general appearance of the recently introduced Holley motor bicycle, made by the Holley Motor Co., of Bradford, Pa. In this machine novelty is patent in the location of the motor, it being secured to the crank hanger of a frame identical in shape to the standard bicycle frame. In fact, the makers state that

the motor alone being twenty-eight pounds. It is averred that vibration is scarcely perceptible when the machine is in motion.

The Holley motor bicycle is started by pushing it along for about ten feet until the first explosion occurs, when the rider jumps on and shuts the relief valve previously opened to lessen the compression. Coasters are provided on the front forks for the rider's feet.

At present the company can make deliveries in thirty days, but it expects to be in a position within a few weeks, on account of increased factory facilities, to



THE HOLLEY MOTOR BICYCLE.

the motor, which is of special construction, may be applied to any ordinary bicycle having a crank hanger with an internal diameter of  $1\frac{1}{8}$  inches. In the complete Holley motor bicycle, however, the frame is heavily built throughout, and triplet tires, rims, spokes, sprockets and chains are used to insure abundant strength.

The motor develops  $1\frac{1}{4}$  horsepower, and the speed can be regulated at will, by timing the ignition, within limits of four to twenty-five miles per hour. The exhaust is well muffled, and, it is stated, cannot be heard more than 100 yards away from the machine.

The weight of the complete cycle is about sixty-four pounds, the weight of

produce twenty cycles per day and to then make immediate deliveries. Each machine is guaranteed against breakage for six months.

The Holley company also supplies the motors, both finished and in the rough, sparking coils, carburetors, vaporizers and all other fittings necessary to construct a complete motor bicycle. The price of the complete motor bicycle as here illustrated is \$200.

#### MOTOR BICYCLE DRIVING GEAR

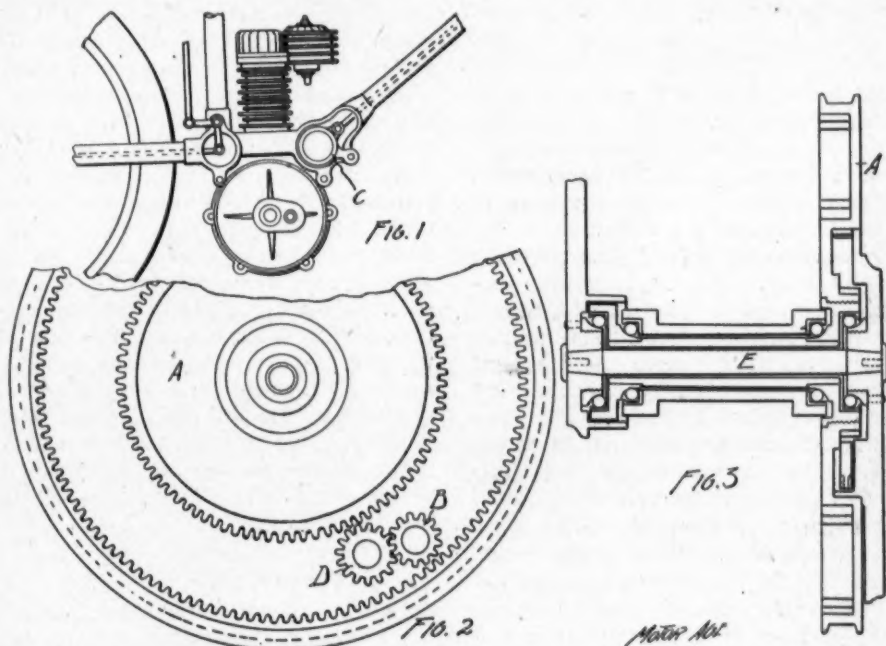
The Chapelle and Chevallier French motor bicycle was described briefly in the issue of August 23 of The Motor Age. Letters patent were granted October 16

to Louis and August Chapelle, of St. Ouen l'Aumone, France, for the driving mechanism employed in this machine.

The motor is supported vertically at the bottom of the frame as shown in Fig. 1 of the accompanying illustration. The main drive wheel of the transmission device is in the form of a large flanged disk A which is furnished with an internal spur gear within its rim and a concentric external spur gear on its inside face. This gear wheel is mounted so that the motor pinion B is located be-

motor pinion B may be brought into engagement with the internal gear on A, with the external gear through the intermediate pinion D, or out of engagement with both. Two forward speeds and entire motor disconnection are thus obtained for the drive wheel A, which connects with the rear wheel of the bicycle by means of a suitable flat belt and a pulley wheel on the rear hub.

The axle upon which the wheel A is mounted is tubular, as shown in Fig. 3, and through it runs the crank axle E



CHAPELLE MOTOR BICYCLE DRIVING MECHANISM.

tween the internal and the external gear teeth and it is supported rotatably on an axle carried in the adjustable crank hanger C. The arrangement of these gears is shown in Fig. 2, in which is also indicated a spur pinion D, mounted on a stub axle projecting from the motor casing and always in mesh with the motor pinion B.

The adjustability of the crank hanger C is controlled by a long link which connects with a hand lever on the forward portion of the bicycle frame. The parts are so disposed with relation to each other that by swinging the hanger and its wheel A into various positions the

to which are rigidly fixed the pedal cranks. The crank on the drive-pulley side is furnished with a rigid disk concentric with the axle and having a flange which fits snugly within the outer wall of a recess in the wheel A. Between the hub of A and the inner side of the flange of the crank disk is a spring clutch mechanism which furnishes "free wheel" or coaster action for the pedal cranks.

The inventors have also included in the machine a belt tension device and a rear hub band brake operating simultaneously with the motor speed transmission device, and whereby when the rider throws the transmission device out of gear the

tension of the belt will be released so that it will slip on the pulleys and cease to drive, and the brake will be set.

#### KEIM'S AUTO FITTINGS

John R. Keim of Buffalo has issued a wall circular of automobile boilers, engines and parts therefor, as well as of running gear forgings, which should be in the hands of all automobile builders.

The running gear forgings are from exclusive patterns and are so arranged and constructed that they may be machined for different angles, allowing of different designs, each distinctive from the others. In making the forgings, care has been taken to forge each piece from stock particularly suited to the requirements it has to fill, taking into consideration the factors of vibration and the peculiar strains to which the running gears of automobiles are put.

The boilers are made in two sizes, 13x14 and 13x16 inches. They are constructed of seamless copper shells, flanged at both ends. Boiler steel heads are riveted to the shell flanges through steel rings. Seamless  $\frac{1}{2}$ -inch copper fire tubes are used, inserted through reamed holes and spun, making perfectly tight joints. The tubes number 298 and 395 in the two sizes of boilers, respectively. A  $\frac{3}{4}$ -inch live steam pipe connection,  $\frac{1}{2}$ -inch pipes for safety valve, water column, feed water and special reinforcements at the throttle valve opening, are features of the boilers. On the exterior of the copper shell are wound three layers of wire of high tensile strength, made for the purpose. This is covered with 1 inch of asbestos cement, which is retained in place from without by a steel case. The boilers are tested to 600 pounds cold water pressure, and before being allowed to leave the factory are thoroughly cleansed.

The engines are of the two-cylinder, slide valve, link motion type, with  $2\frac{1}{2}$ x $3\frac{1}{2}$ -inch cylinders. The steam chest is cast in one piece with and between the cylinders. The engines are constructed in the best manner throughout.

The concern is prepared, in addition to furnishing promptly its standard goods,

to furnish estimates on special forgings, sheet steel, brass or copper stampings, machine screw products, exclusive shapes in air and gasoline tanks, castings for engine frames or cylinders, springs, steel frames for the interior of bodies, supporting the body and mechanism, and a variety of other automobile work.

The Keim automobile product has been placed on the market only after careful study of the needs of the industry, supplemented by extensive experiments.

#### AN ATTRACTIVE TIRE CATALOGUE

The Diamond Rubber Co., of Akron, O., have issued a new catalogue of automobile, carriage and bicycle tires. The catalogue, in keeping with the well known business policy of the company, is neither cheap nor verbose. Good paper, good printing, and the brief and pointed recital of what the company have to say, makes it an ideal brochure, admirably accomplishing the purpose for which it was issued. One particularly commendable feature of the catalogue is the words of warning to manufacturers and users of automobiles, as to the proper manner of attaching tires and their proper use, when attached. Particularly in a business so young as the automobile industry, are words of caution, from veterans of the business, of value.

#### THE BUSINESS GROWING

The outside world may gain a slight idea of the growing importance of the automobile business in Philadelphia from the statement that within the shadow of the great city hall tower—hardly a quarter of a mile distant in any direction—there are nearly a score of establishments devoted to the manufacture, repair or sale of horseless vehicles, besides several offices where local representatives of foreign manufacturers hold forth. For instance, two of the largest steam wagon manufacturers in the country have branch stores almost within a stone's throw of the huge marble pile (which, by the way, has cost Philadelphia's taxpayers \$23,000,000 and is not yet finished), besides a sub-agency in a department store just across the street. On North Broad Street



there are no less than seven agencies, while Arch Street can boast of five—many of these, be it understood, are in a position to deliver vehicles on demand, while the majority of the others are rapidly nearing the point where orders may be filled on short notice. On Race Street there is a single concern; the Drexel building containing the offices of two out-of-town concerns, and in the Betz and Wrightman buildings are the offices of the representatives of two foreign manufacturers. Aside from these, there are well-founded rumors of the establishment of several additional concerns in the near future—the property transfer list on Monday last, for instance, containing a reference to the transfer to an automobile manufacturing company of three adjoining properties on North Broad Street—right in the heart of "Automobile Row."

Although photographs of motor bicycles have been seen here in plentiful profusion, the first local dealer to show the real thing up to date is Georges Robb, at whose establishment on Arch Street are shown several two-wheelers with motor attached. Mr. Robb states that the motors are of  $2\frac{1}{4}$ -horsepower, but none of the machines have as yet been seen in actual operation.

#### THE INDUSTRY IN ITALY

The motor-car industry in Italy is still in its infancy. Two concerns of importance have started works in Milan, viz., Prinetti Stucchi, having a very large plant in connection with their carriage and bicycle works, and C. Bianchi. There is also one automobile establishment in Rome, but it is of recent creation and has not reached any importance. A certain number of automobiles of foreign make have been introduced into Italy and have met with public favor, which should be encouraging for the future development of that industry in Italy.

#### FAVORS AUTOMOBILE SHOWS

According to program the cycle and automobile trade will have plenty of opportunity to exhibit their 1901 lines to

the public through the shows in New York and Chicago. The more people see of the automobile the more they will like this style of vehicle. The sooner they become familiar with its mechanism, serviceableness, comfort in traveling, etc., the quicker the manufacturers will receive returns for money invested. While, of course, many shows cost much money for the manufacturers, yet the interest aroused makes business better in the industries referred to.—Cycling West and Motor Field.

#### PROGRESS IN BUENOS AYRES

Mail advices from Buenos Ayres state that the use of electric and oil-power motor cars in the Argentine capital is developing rapidly. Not only heavy delivery wagons, but also luxurious carriages driven by oil or electricity are frequently to be met with on the streets of that city. The roads are gradually being improved, and a touring club has been formed with a view to watching over the interests of automobilism. One of the first resolutions of this club, the members of which comprise many merchants and influential amateurs, has been to establish throughout all the provinces of the Republic, roads specially reserved for bicycles and light motor cars. These roads already radiate from Buenos Ayres for a distance of from sixty to seventy miles, and the work will be continued till a network of similar roads exist all over the country.

#### NEW YORK TRADE NOTES

New York, Oct. 20.—The transfer of the Worcester Cycle Manufacturing Co. factory at Middletown, Conn., to the New York Motor Vehicle Co., of this city, has been completed through the American Surety Co.

Leon Schermerhorn, manager of the Steam Vehicle Company of America, wishes it stated that the price of Reading stanhopes is \$750 and not \$700, as the types had it in the last issue of The Motor Age.

It is reported that a large portion of the money required for the purchase of the Overman automobile foreign patents

has been raised by a Parisian syndicate as a result of President A. H. Overman's recent visit.

the No. 3 Locomobile contributed by the Locomobile Company of America to the Waldorf-Astoria bazaar for the benefit of the Galveston sufferers was won by Count Luzimsky Valla Rezsa. Two thousand tickets at \$1 each were sold.

Owen & Chamberlin are mere tenants of the Automobile Storage Station and Repair Co., on West Sixty-sixth Street and not proprietors as erroneously stated recently in these columns.

#### BRIEF NEWS OF THE INDUSTRY

The Blood-Mille Motor Co., of Minneapolis, has been incorporated for \$500,000.

The Searchmont Motor Co., of Wilmington, Del., has been incorporated for \$2,500.

The Jenkins Automobile Co., of Washington, has been incorporated under the laws of Delaware for \$100,000.

The Knox Automobile Co., of Springfield, Mass., has turned out its first vehicle, a gasoline voiturette with a single steering wheel in front.

The Utica (N. Y.) Press gives a glowing account of the excellence of a Remington motor vehicle which has recently been seen in that town.

The American Coil Co. of West Somerville, Mass., has issued a very attractive little catalogue descriptive of their sparking coils and sparking plugs.

The Hudson Gas Motor & Vehicle Co. has filed a certificate with the secretary of state of New York, certifying that half of its capital stock has been paid in.

F. B. Stearns & Co. of Cleveland have secured a factory site on Euclid Avenue, near the Nickel Plate tracks. The factory will be commodious, and equipped with new machinery.

The MacDonald, Wessels & Ames Co., of Detroit, are makers of grips suitable for bicycle handlebars or automobile steering levers. One, of which a sample has been submitted to The Motor Age, has a hard wood core in one piece, wrapped with leather, all of which is turned smooth and given a high polish over its brown surface. It is finished with

a nickel plated ferrule. Too good for a bicycle, one might think, but quite in keeping with a first class motor vehicle.

The Manhattan Automobile Co. has been incorporated by Boston men, under Maine laws, with an authorized capital of \$350,000.

Various New York cities are bidding vigorously for the location of the Remington Automobile Co.'s plant. Indications point, however, to its remaining at Ilion.

The Springfield Motor Vehicle Co., of Springfield, Mass., has been incorporated with a capital stock of \$50,000. C. A. Royce is president and C. C. Lewis, treasurer.

Otto Konigslow of Cleveland is manufacturing standard running gears, less tires, and the parts that go to make up the running gears, as well as ball bearing cases of pressed steel.

The Woodruff Motor Carriage Co. of Cleveland has been incorporated, with a capital stock of \$50,000. A temporary factory has been established on Pearl Street, where a gasoline vehicle is being made.

The stockholders of the Lewis Motor Vehicle Co., who recently distributed the assets of the company among the stockholders, have reduced their capital stock to \$90,000, to preserve their charter and avoid taxation, under New Jersey laws.

It is reported that Sipe & Sigler, the manufacturers of the well known Willard batteries, have decided to build electric vehicles on a commercial scale, having already built vehicles for the purpose of demonstrating the possibilities of their batteries.

The De Dion-Bouton Motorette Co., of Church Lane and Thirty-seventh Street, Brooklyn, are making a special feature of their dry batteries, sparking plugs and motor oil, catering not only to those who use the De Dion motor vehicles and motorcycles, but to automobile and engine builders and automobilists in general. The company claim that their dry batteries will operate without fail for 200 hours of 3,500 miles. These sell for \$10. The \$2 sparking plugs, they claim, will withstand any degree of heat. The motor oil is a blended mineral product and is

# AUTOMOBILE MATERIALS AND

## STEAM WAGON PARTS

Complete Sets Running Gear Forgings, including:

Front and Rear Wheel Clips

Driving Gear Clips

Reach Braces and Clips

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Iron Frames for Special or Standard Shaped Bodies to support Mechanism.

Castings or Forgings made to order, or estimated on in any quantities.

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JOHN R. KEIM, BUFFALO, N. Y., U. S. A.

put up in quart, half gallon and one gallon cans.

In a new Ariel motor tricycle manufactured by the Cycle Components Co. of England, the motor is disconnected from the driving mechanism at will, so that the motor may run when the cycle is at a standstill, the same as in the ordinary gasoline vehicle. A system of friction clutches is used.

Thomas N. Ross, of Philadelphia has established at 3941 Lancaster Avenue the "West Philadelphia Automobile Station." In addition to hiring, storing and repairing automobiles of all types, Mr. Ross has secured the agency for the sale in the section west of the Schuylkill of the product of the Mobile Co. of America.

The Joseph Dixon Crucible Co., of Jersey City, N. J., have issued an attractive folder illustrating the Park Street Bridge at Cincinnati, under which, it is stated, an average of 500 locomotives pass daily, illustrating the durability of their silica-graphite paint, which, it is stated, has resisted the action of fumes for five years

on this bridge. The department of the Dixon company, it may be added, have a most happy faculty of putting the merits of their varied wares before the public.

The Cleveland Automobile & Supply Co. have received a number of vehicles which they are using for renting purposes.

### MISCELLANEOUS

Advertisements under this head 5 cents per word, cash with order. Express orders, post office orders, or postage stamps accepted.

### FOR SALE

**FOR SALE**—The Automobile Storage and Repair Co., 57 West 66th St., New York, have new and second-hand steam, gasoline, and electric carriages constantly on hand and have always some special bargains.

**FOR SALE**—Two  $1\frac{1}{4}$ -horsepower air-cooled motors, new. WHEATON AUTOMOBILE COMPANY, Minneapolis, Minn.

### WANTED

**CAPITALIST or manufacturer wanted to take up the manufacture of an entirely new line of automobile parts, including a gasoline motor with a scavenging charge and a cylinder charge above atmospheric pressure before compression, without the use of any additional mechanism; also rear axle with two forward and one backward speed and brake in differential gear case. L. ELLIOTT BROOKER, care The Motor Age.**



## HERCULES MOTOR CO.

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# Automobiles



These gasoline motors are useful where a small unit of power is required, as for bicycles, tricycles, launches, etc. ❦ ❦

We also furnish same type of engine with water jacket. ❦ ❦ ❦ ❦ ❦



1,  $1\frac{1}{2}$ , 2,  $2\frac{1}{2}$ , 3,  $3\frac{1}{2}$  h. p.

Speed from 300 to 1100 revolutions.

13-21 Park Row, NEW YORK, U. S. A.

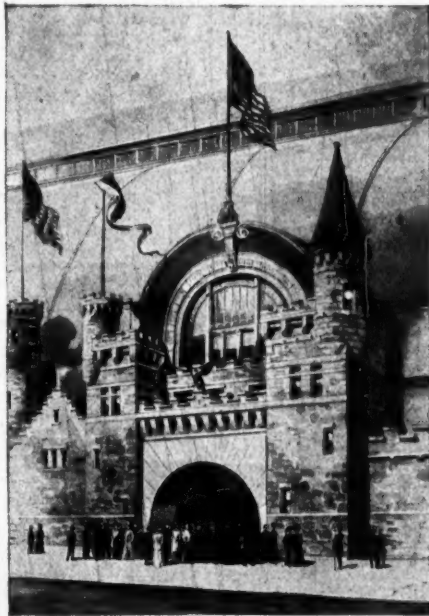


FIRST ANNUAL

# Automobile Show

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The Coliseum, CHICAGO

March 23 to 30, 1901

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Complete sets castings for constructing a 4 H. P. gasoline motor as described in recent issues of this magazine. Rough or machined, with steel screws, cut gears, valve forgings etc. Carbureters, sparking plugs, coils and accessories. Also bicycle motors and castings of same. Correspondence solicited.

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Represented by Chas. E. Miller, 97 Reade St., New York, at space 14 Madison Square Garden, Nov. 8 to 10.

## ATLANTIC TUBE CO.

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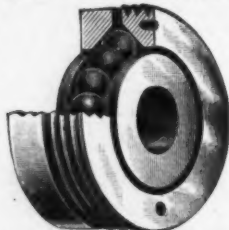
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ALL SIZES.

Made by the only bicycle spoke manufacturer in the world.

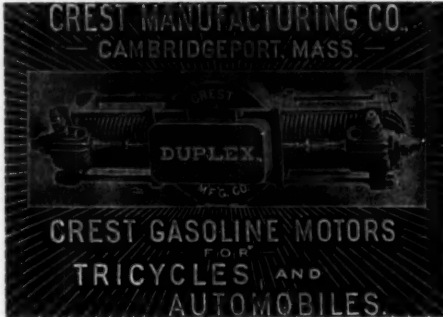
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THE STANDARD SPOKE & NIPPLE COMPANY.

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The LIGHTEST and CHEAPEST Motor Per Horse-Power Made in the World.

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## SPROCKET WHEELS

in all sizes and  
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## THE APPLE IGNITER



Fitted with spark coil  
and governor pulley  
for starting without  
battery and for main-  
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We furnish  
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## For Motor Vehicles

Dixon's Pure Flake Graphite Lubri-  
cants for Engine Cylinders, Chains,  
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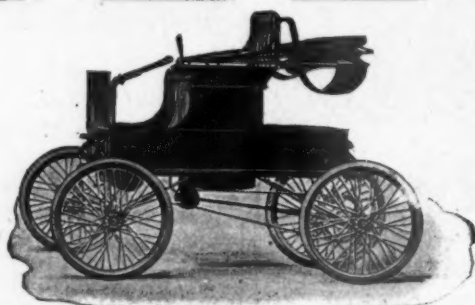
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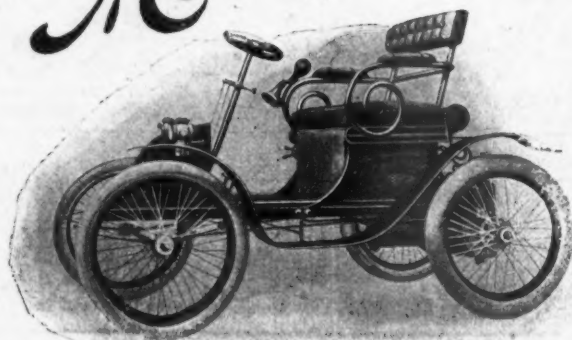
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Success follows the adoption of our WHEELER ENDLESS solid rubber clincher tires on heavy vehicles requiring 2½ to 4-inch tires. Labor saved in application; trouble avoided in use . . . Can be fitted to the rim without the assistance of machinery and will outwear two of any other kind of tires. The cut shows the principle. Write for other facts and for terms . . . . .

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MAKERS OF PARTS FOR

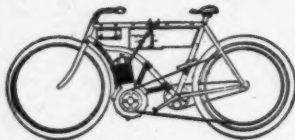
# Automobiles

These gasoline motors are useful where a small unit of power is required, as for bicycles, tricycles, launches, etc.   
We also furnish same type of engine with water jacket. 

  
1, 1½, 2, 2½, 3, 3½ h. p.  
Speed from 300 to 1100 revolutions.

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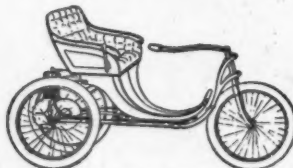
MECHANICALLY  
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An Ideal Roadster.

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Cheapest mode of transportation known to mankind. Every bicycle dealer, manufacturer and repairman is interested. Send for catalogue and discounts.

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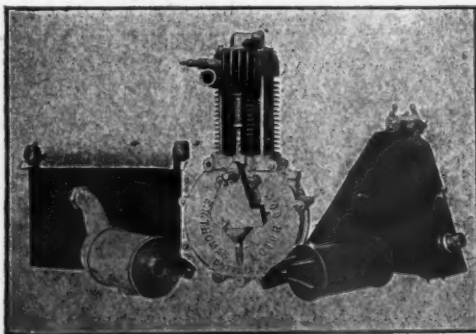
**1½ I. H. P.**  
for motor bicycles.

HEIGHT, 12 inches.

WIDTH CRANK CASE  
3¼ inches.

WEIGHT, 20 lbs.

**IMMEDIATE  
SHIPMENT.**



**3 I. H. P.**  
for tricycles, quadricycles, etc.

HEIGHT, 18¼ in.

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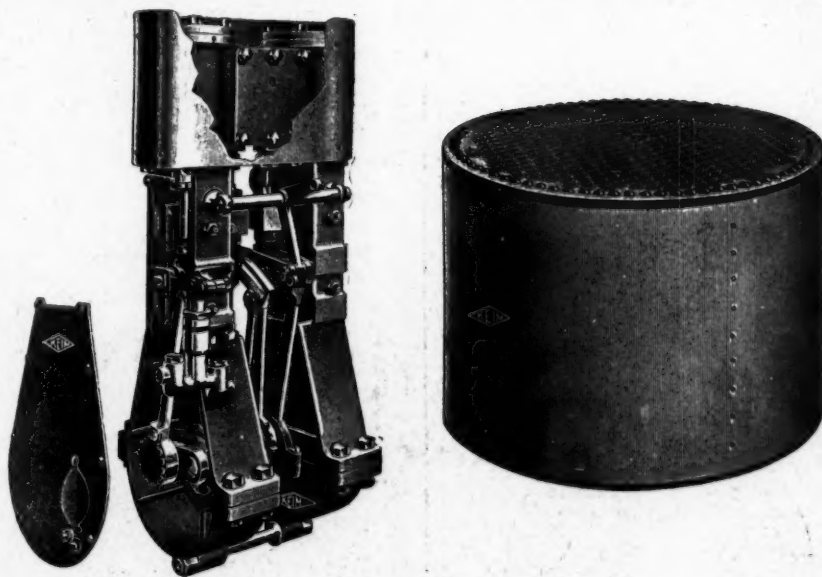
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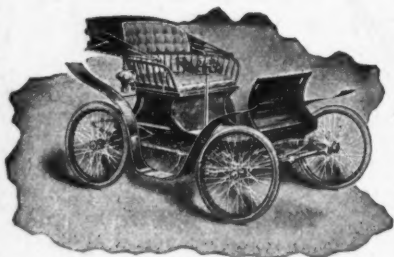
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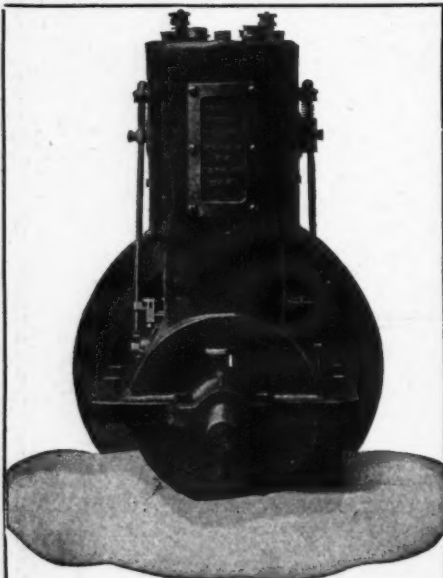
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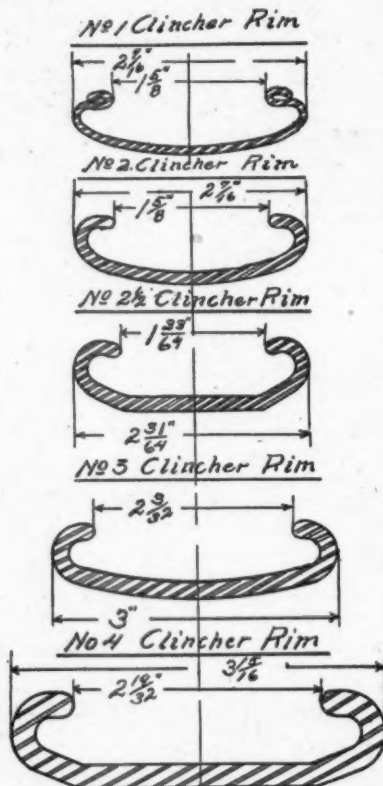
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